



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,672	11/21/2003	Alexandre Corjon	245497US41X CONT	9066
22850	7590	08/14/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER MANSEN, MICHAEL R	
			ART UNIT 3644	PAPER NUMBER
			NOTIFICATION DATE 08/14/2008	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ALEXANDRE CORJON, THOMAS LEWEKE, and
FLORENT LAPORTE

Appeal 2008-1522
Application 10/717,672
Technology Center 3600

Decided: August 12, 2008

Before WILLIAM F. PATE, III, HUBERT C. LORIN, and LINDA E.
HORNER, *Administrative Patent Judges*.

HORNER, *Administrative Patent Judge*.

DECISION ON APPEAL

Appeal No. 2008-1522
Appl. No. 10/717,672

STATEMENT OF THE CASE

Alexandre Corjon et al. (Appellants) seek our review under 35 U.S.C. § 134 of the final rejection of claims 1, 2, 8-11, 14-20, 23-30, 33, and 36. Claims 3-7, 12, 13, 21, 22, 31, 32, 34, and 35 have been withdrawn. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

SUMMARY OF DECISION

We AFFIRM-IN-PART and ENTER A NEW GROUND OF REJECTION PURSUANT TO OUR AUTHORITY UNDER 37 C.F.R. § 41.50(b).

THE INVENTION

The Appellants' claimed invention is to an aircraft designed to accelerate the destruction of a pair of contra-rotating vortices created in the wake of the aircraft at take-off and landing (Spec. 2:20-22). Claim 1, reproduced below, is representative of the subject matter on appeal.

1. An aircraft comprising:
 - a wing forming a vortex at a rear portion thereof by a merging of a first co-rotating eddy with a second co-rotating eddy; and
 - a perturbation device disposed adjacent an area of creation of the first co-rotating eddy, the perturbation device being configured to generate a periodic perturbation having a wavelength configured to excite at least one instability mode of the first co-rotating eddy to accelerate a destruction of the vortex.

THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Yuan	US 3,936,013	Feb. 3, 1976
Bilanin	US 6,042,059	Mar. 28, 2000

The Examiner rejected claims 1, 2, 8-11, 14-20, 23-30, 33, and 36 under 35 U.S.C. § 102(b) as anticipated by Yuan, or, in the alternative, under 35 U.S.C. § 103(a) as unpatentable over Yuan in view of ordinary skill in the art.¹

ISSUES

The issue before us is whether the Appellants have shown that the Examiner erred in rejecting claims 1, 2, 8-11, 14-20, 23-30, 33, and 36 as anticipated by Yuan or unpatentable over Yuan in view of ordinary skill in the art. This issue turns on whether Yuan's vortex control device is configured to excite at least one instability mode of the first co-rotating eddy to accelerate a destruction of the vortex.

FINDINGS OF FACT

We find that the following enumerated findings are supported by at least a preponderance of the evidence. *Ethicon, Inc. v. Quigg*, 849 F.2d

¹ The Examiner relies on Bilanin as evidence of the level of skill of one having ordinary skill in the art (Ans. 4).

1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

1. One having ordinary skill in the art at the time of the invention would have known that vortex pairs generated by airplane wings are inherently unstable and eventually break up due to the growth of disturbances introduced directly or indirectly by atmospheric turbulence (Bilanin, col. 1, ll. 45-48).
2. One having ordinary skill in the art at the time of the invention would have known that an appropriate and attractive method for reducing vortex hazard is the acceleration of instabilities in the wake arising from the mutual interaction of vortices in the wake (Bilanin, col. 4, ll. 5-8).
3. One having ordinary skill in the art at the time of the invention would have known that such interactions are the actual mechanism that dissipates the wake when appropriately excited by atmospheric turbulence (Bilanin, col. 4, ll. 8-10).
4. One having ordinary skill in the art at the time of the invention would have known that a logical method for accelerating this process is to employ an active mechanical system for exciting the most unstable modes of motion in the wake (Bilanin, col. 4, ll. 10-13).
5. One having ordinary skill in the art at the time of the invention would have known to use a vortex leveraging system to enhance the breakup of trailing vortex pairs, which system includes

introducing time-varying disturbances from small aerodynamic surfaces to excite instabilities associated with the multiple-pair wake (Bilanin, col. 4, ll. 42-45).

6. One having ordinary skill in the art at the time of the invention would have known to use such vortex leveraging surfaces so that the strength of the secondary “leveraging” vortices they generate is varied in time at carefully selected frequencies, which are chosen to maximize the system’s effect on rapidly building up the instabilities of the multiple-pair wake and thereby more rapidly breaking up the entire vortex wake structure (Bilanin, col. 4, ll. 58-65).
7. One having ordinary skill in the art at the time of the invention would have known of methods other than those disclosed in Bilanin for achieving the necessary time-varying perturbation in the vortex position (Bilanin, col. 8, ll. 22-25).
8. Yuan discloses a vortex control device for an airplane (Yuan, col. 1, ll. 5-7).
9. Yuan discloses introducing an intermittent tip blowing jet into a wing-tip vortex to break up the wing-tip vortex formation (Yuan, col. 2, ll. 46-49).
10. Yuan discloses a wing-tip system having an extended tube 21 (extending in an X-direction) for blowing a jet of fluid through an orifice 22 in a downward Y-direction (Yuan, col. 3, ll. 38-47).

11. The blowing jets of Yuan are designed so that the downward jet flow counterbalances and breaks up the counterclockwise upward flow of the wing-tip vortex (Yuan, col. 3, ll. 52-57), thus causing instability in the eddy emanating from the wing-tip.
12. As such, Yuan's vortex control device uses a jet flow system to abate the circulatory flow created near the wing-tip and to alleviate wing-tip vortices (Yuan, col. 3, ll. 59-61).
13. Thus, Yuan teaches a device disposed adjacent an area of creation of a first co-rotating eddy that generates a periodic perturbation, which inherently has a wavelength.
14. Yuan's perturbation is designed to accelerate destruction of the vortex.
15. Yuan and Bilanin are both directed to solving the same wake turbulence problem that occurs during take-off and landing of an airplane (Yuan, col. 1, l. 5 - col. 2, l. 9; Bilanin, col. 1, ll. 20-60).

PRINCIPLES OF LAW

"Both anticipation under § 102 and obviousness under § 103 are two-step inquiries. The first step in both analyses is a proper construction of the claims. . . . The second step in the analyses requires a comparison of the properly construed claim to the prior art." *Medichem, S.A. v. Rolabo, S.L.*, 353 F.3d 928, 933 (Fed. Cir. 2003) (internal citations omitted).

We determine the scope of the claims in patent applications not solely on the basis of the claim language, but upon giving claims "their broadest

Appeal No. 2008-1522
Appl. No. 10/717,672

reasonable interpretation consistent with the specification” and “in light of the specification as it would be interpreted by one of ordinary skill in the art.” *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

“Section 103 forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’” *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S. Ct. at 1734 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”)

The person of ordinary skill in the art is a hypothetical person who is presumed to know the relevant prior art. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962, 1 USPQ2d 1196, 1201 (Fed. Cir. 1986). In determining this skill level, the court may consider various factors including “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and

Appeal No. 2008-1522
Appl. No. 10/717,672

educational level of active workers in the field.”

Id. In a given case, every factor may not be present, and one or more factors may predominate.

Id. at 962-63, 1 USPQ2d at 1201.

In re GPAC, 57 F.3d 1573, 1579 (Fed. Cir. 1995).

In *KSR*, the Supreme Court emphasized “the need for caution in granting a patent based on the combination of elements found in the prior art,” *id.* at 1739, and discussed circumstances in which a patent might be determined to be obvious. In particular, the Supreme Court emphasized that “the principles laid down in *Graham* reaffirmed the ‘functional approach’ of *Hotchkiss*, 11 How. 248.” *KSR*, 127 S. Ct. at 1739 (citing *Graham*, 383 U.S. at 12), and reaffirmed principles based on its precedent that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* The Court explained:

When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

Id. at 1740. The operative question in this “functional approach” is thus “whether the improvement is more than the predictable use of prior art elements according to their established functions.” *Id.*

The Supreme Court stated that “[t]hree cases decided after *Graham* illustrate the application of this doctrine.” *Id.* at 1739. “In *United States v. Adams*, ... [t]he Court recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *Id.* at 1739-40. “*Sakraida and Anderson’s-Black Rock* are illustrative – a court must ask whether the improvement is more than the predictable use of prior art elements according to their established function.” *Id.* at 1740.

The Supreme Court stated that “[f]ollowing these principles may be more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement.” *Id.* The Court explained:

Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

Id. at 1740-41. The Court noted that “[t]o facilitate review, this analysis should be made explicit.” *Id.* (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”)). However, “the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.*

ANALYSIS

Claim 1

The Examiner found that Yuan teaches that the tube (21) can be located at almost any position that results in increased aerodynamic efficiency; and if Yuan does not specifically teach this, it would have been obvious in light of the teachings of Yuan (Ans. 3-4). The Examiner also found that “the wavelengths generated by Yuan’s jets are exciting an instability mode of the eddies such that they accelerate the destruction of the trailing vortices” or it would have been obvious to use such wavelengths in view of the knowledge of one having ordinary skill in the art (Ans. 4).

The Appellants contend that the Examiner erred in the rejection of claim 1, because “Yuan does not teach any structure that functions to excite *any* instability mode of a vortex, nor has any such structure been cited by the outstanding Office Action” (App. Br. 5).

Appeal No. 2008-1522
Appl. No. 10/717,672

A patent applicant is free to recite features of an apparatus either structurally or functionally. *See In re Swinehart*, 439 F.2d 210, 212 (CCPA 1971) (“[T]here is nothing intrinsically wrong with [defining something by what it does rather than what it is] in drafting patent claims.”). Yet, choosing to define an element functionally, i.e., by what it does, carries with it a risk. *In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997). As stated in *Swinehart*, 439 F.2d at 213:

where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on.

“It is well settled that the recitation of a new intended use for an old product does not make a claim to that old product patentable.” *Schreiber*, 128 F.3d at 1477 (citations omitted).

We agree with the Examiner that Yuan teaches a device disposed adjacent an area of creation of a first co-rotating eddy that generates a periodic perturbation and that the perturbation inherently has a wavelength (Facts 8-13). We also find that Yuan’s perturbation is designed to accelerate destruction of the vortex (Fact 14). The issue is whether the wavelength of the perturbation of Yuan’s device is configured “to excite at least one instability mode of the first co-rotating eddy.”

Although the Appellants' Specification discusses "core instability modes" and "exciting at least one of the said instability modes of the corresponding eddy in such a way as to increase the core of the contra-rotating vortex" (Spec. 4: 16-22), the claims are not limited to exciting the eddy to affect the core of the associated vortex. Rather, the claims broadly recite exciting an instability mode of the first eddy. The Appellants' Specification does not provide any definition of "instability mode." The ordinary meaning of "excite" in the physics art is to increase the energy of. *The American Heritage Dictionary of the English Language* (4th ed. 2000). The ordinary meaning of "mode" is a given condition of function; a status. *The American Heritage Dictionary of the English Language* (4th ed. 2000). As such, we broadly construe the claim language "configured to excite at least one instability mode of the first co-rotating eddy" to mean that the perturbation device must be configured to increase the instability of the first co-rotating eddy.

Vortex pairs generated by airplane wings are inherently unstable (Fact 1). Yuan discloses that its blowing jets, which direct the jets in a downward direction, cause further instability in the vortex (which is made up of two co-rotating eddies), because the downward jet flow counterbalances and breaks up the counterclockwise upward flow of the wing-tip vortex (Fact 11). Thus, we find that the structure disclosed in Yuan increases the instability of the first co-rotating eddy and thereby meets the functional limitation of claim 1.

We further agree with the Examiner's alternative reasoning that it would have been obvious to tailor the wavelength of the blowing jets of Yuan "to excite at least one instability mode of the first co-rotating eddy to accelerate a destruction of the vortex" in view of the common knowledge of one having ordinary skill in the art. One having ordinary skill in the art at the time of the invention would have known that vortex pairs are inherently unstable and eventually break up due to the growth of disturbances introduced directly or indirectly by atmospheric turbulence and that an appropriate and attractive method for reducing vortex hazard is the acceleration of instabilities in the wake arising from the mutual interaction of vortices in the wake (Facts 1-3). One having ordinary skill in the art would have also known to use an active mechanical system to introduce time-varying disturbances, at carefully selected frequencies, to maximize the excitation of the instabilities of the multiple-pair wake and thereby more rapidly breaking up the entire vortex wake structure (Facts 4-7). Yuan provides an active mechanical system for introducing disturbances into an airplane's wake (Fact 11). Both Yuan and Bilanin are directed to solving the same wake turbulence problem that occurs during take-off and landing of an airplane (Fact 15). As such, the use of Yuan's vortex control device to excite the instability mode of a co-rotating eddy in order to accelerate destruction of a vortex is nothing more than a predictable variation of the technique already known in the art for destruction of trailing vortices. *KSR*, 127 S. Ct. at 1740. Thus, we agree with the Examiner that it would have been obvious to one having ordinary skill in the art at the time of the

invention to carefully select the frequencies of the intermittent fluid jets of Yuan in order to maximize the excitation of the instabilities of the multiple-pair wake to accelerate destruction of the entire vortex wake structure in view of the purpose of Yuan's vortex control device, *viz.*, to accelerate elimination of wakes, and in view of the knowledge in the art at the time of the invention. Accordingly, we sustain the Examiner's rejection of claim 1 as being anticipated by Yuan or, in the alternative, unpatentable over Yuan in view of the level of ordinary skill in the art.

The Appellants have not presented any separate arguments for patentability of dependent claims 2, 8, 9, 18-20, 23, and 33, which depend from claim 1, nor have the Appellants presented any separate arguments for patentability of independent claim 16 or its dependent claims 17 and 27-30 (App. Br. 8). As such, these claims fall with claim 1.

Claim 10

The Appellants contend that the Examiner further erred in the rejection of claim 10, because the Examiner's conclusion that the recited function of generating a perturbation amounts to an intended use is improper for rejection of a means-plus-function element (App. Br. 5). As such, the Appellants acknowledge that they intended the "means for generating" element of claim 10 to be construed as a means-plus-function limitation under 35 U.S.C. § 112, sixth paragraph.

Once a court concludes that a claim limitation is a means-plus-function limitation, two steps of claim construction remain: 1) the court must

Appeal No. 2008-1522
Appl. No. 10/717,672

first identify the function of the limitation; and 2) the court must then look to the specification and identify the corresponding structure for that function. *Med. Instrumentation & Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1210 (Fed. Cir. 2003). The function of the limitation is “generating a periodic perturbation having a wavelength configured to excite at least one instability mode of the first co-rotating eddy.”

The Appellants identify that “[t]he means for generating a periodic perturbation 11 includes as a structural element the unstreamlined element 13 described from page 13, line 9 to page 14, line 10 and shown in Figure 2” (Reply Br. 3). The Appellants’ Specification describes:

Preferably, this unstreamlined element 13 is a cylinder, of circular section for example, as shown in FIG. 2. However, this cylinder can also have an elliptical section or any other section. The element can also be a flat plate with a high angle of incidence, inclined at 45.degree. for example.

(Spec. 13:13-16).

The Specification also describes a second embodiment including means for generating a periodic perturbation 12, as shown in Figure 3 and described on page 14, lines 11-24. In particular, “perturbation means 12 has a means 14 of an ordinary type for producing a jet of fluid 15” (Spec. 14:11-12). “This jet of fluid 15 is emitted transversely with respect to the flow E in such a way as to generate the perturbation P” (Spec. 14:13-15). The Specification describes perturbation means 12 by use of a second “means” 14 for producing a jet of fluid. No specific structure to achieve this function is disclosed in the Specification. Instead, means 14 is shown simply as a

numbered box in Figure 3. As such, if the “means for generating” element of claim 10 is interpreted to cover perturbation means 12, the claim would be indefinite under 35 U.S.C. § 112, second paragraph. *Biomedino, LLC v. Waters Technologies Corp.*, 490 F.3d 946, 950 (Fed. Cir. 2007) (“If there is no structure in the specification corresponding to the means-plus-function limitation in the claims, the claim will be found invalid as indefinite.”); *In re Donaldson Co.*, 16 F.3d 1189, 1195 (Fed. Cir. 1994) (en banc) (“[I]f one employs means-plus-function language in a claim, one must set forth in the specification an adequate disclosure showing what is meant by that language. If an applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112.”) We assume this is why the Appellants chose to limit the interpretation of this claim element in their Reply Brief to cover only perturbation means 11, for which definite structure is provided in the Specification.

Having this understanding of the scope of the “means for generating” element in mind, we enter a new ground of rejection under 35 U.S.C. § 112, second paragraph, of dependent claim 14, which recites that “the means for generating comprises a fluid jet” and claims 15 and 26, which depend from claim 14. We also enter a new ground of rejection under 35 U.S.C. § 112, second paragraph of dependent claim 36, which recites that “the means for generating is configured to eject a fluid at a velocity equal to or greater than a velocity of the aircraft.” A fluid jet is the result of the means for generating, but it does not describe sufficient structure of how that result is

Appeal No. 2008-1522
Appl. No. 10/717,672

achieved. As such, the Appellants have failed to particularly point out and distinctly claim the invention recited in claims 14, 16, 26, and 36.

Turning our attention back to claim 10, and bearing in mind our interpretation of the “means for generating” limitation of claim 10 as being limited to perturbation means 11 having an unstreamlined element 13, the Examiner found that “[Yuan’s] jet fluid device is an element that projects from the wing of the aircraft and has a cross section that appears substantially circular or elliptical (see Figure 5 to Yuan)” (Ans. 8). We agree that the jet fluid device, as shown in Figure 5 of Yuan, is substantially circular, and the Appellants failed to rebut the Examiner’s finding that the structure disclosed in Yuan is the same as or equivalent to the perturbation means 11 having an unstreamlined element 13, as described in Appellants’ Specification. As such, the Appellants have not persuaded us of error in the Examiner’s rejection of claim 10 or its dependent claims 11, 14, 15, 24-26, and 36.

CONCLUSIONS

We conclude the Appellants failed to show that the Examiner erred in rejecting claims 1, 2, 8-11, 14-20, 23-30, 33, and 36 under 35 U.S.C. § 102(b) as anticipated by Yuan or, in the alternative, under 35 U.S.C. § 103(a) as unpatentable over Yuan in view of the ordinary skill in the art.

Appeal No. 2008-1522
Appl. No. 10/717,672

DECISION

The decision of the Examiner to reject claims 1, 2, 8-11, 14-20, 23-30, 33, and 36 is affirmed. We enter a new ground of rejection of claims 14, 15, 26, and 36 under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the invention.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED; 37 C.F.R. § 41.50(b)

hh

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314